

Forest Statistics Series:

West Virginia No. 4

**Forest Statistics**  
for the  
**Southeastern**  
**Section**  
of West Virginia

Northeastern Forest Experiment Station

Upper Darby, Pennsylvania  
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United States Department of Agriculture • • • Forest Service

## FOREWORD

This is the fourth in a new series of reports about forest areas and timber volume in the State of West Virginia. It is a product of the forest survey of the Northeast, carried on by the Northeastern Forest Experiment Station as part of the Nation-wide forest survey being made by the Forest Service, U. S. Department of Agriculture.

This report supersedes the preliminary statistical report that was issued for Southeastern West Virginia in 1949. The volumes in that preliminary report were computed from standard volume tables. However, local volume tables, constructed when the survey was completed for the entire State, showed that the average tree in West Virginia has more taper than was provided for in the volume tables originally used. This meant, of course, that the preliminary volume estimates were too high.

In addition, a recently completed study of log quality in the State showed that some of the material originally included in the hardwood saw-timber volume is unsuitable for standard lumber, tie, or timber logs. The total saw-timber volume has been reduced further to correct for this.

The West Virginia Conservation Commission provided most of the aerial photographs used in this survey, and assigned a number of Commission employees to assist in carrying out the field work. Some of the photographs were provided by the Monongahela National Forest.

Similar reports will be issued for the other four sections of the State.

Field work in this section of West Virginia was supervised by Harry W. Camp, Jr. C. Allen Bickford developed the statistical procedures used in the survey. Computations were made under the supervision of Roland H. Ferguson.

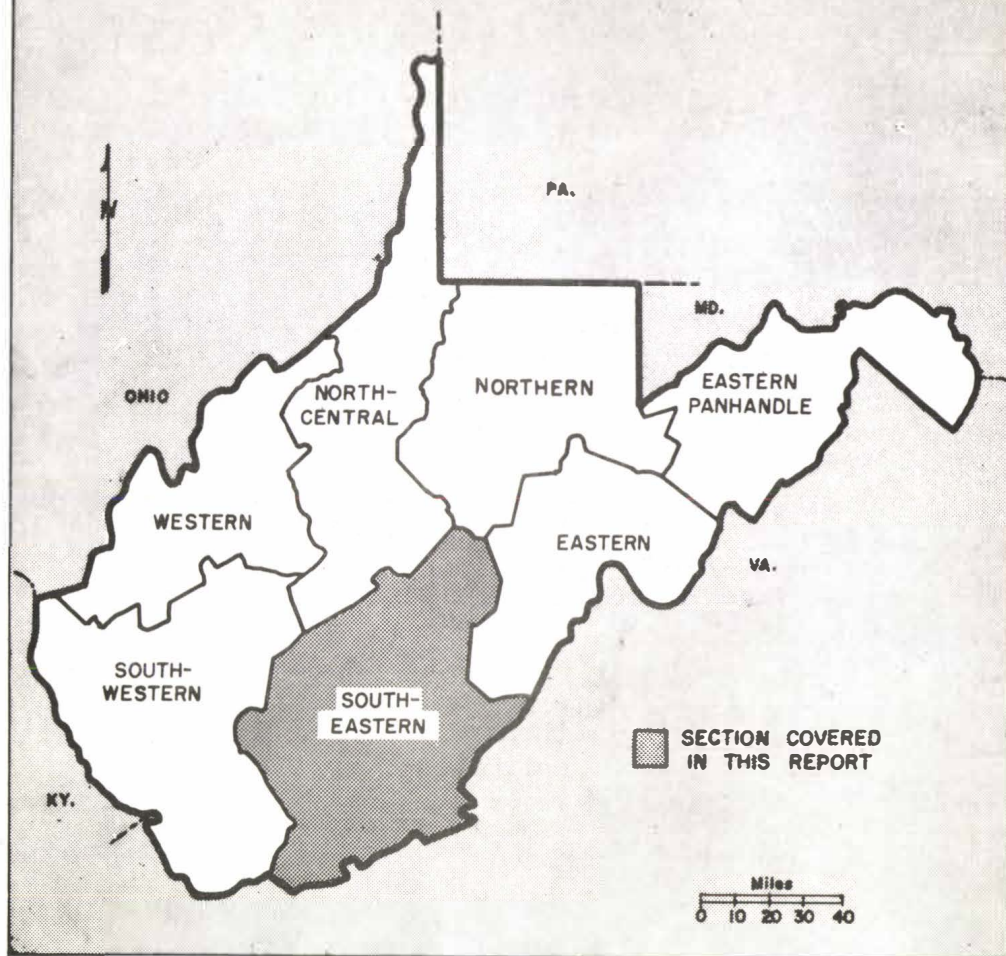
*Ralph W. Marquis*

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Director

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FOREST SURVEY UNITS  
OF  
WEST VIRGINIA



FOREST STATISTICS  
FOR THE  
SOUTHEASTERN SECTION  
OF WEST VIRGINIA

by

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GENERAL

The Southeastern Section of West Virginia includes eight counties: Fayette, Greenbrier, Mercer, Monroe, Nicholas, Raleigh, Summers, and Webster.

A series of high ridges (part of the Allegheny Mountains) lie along the eastern boundary of this area. Immediately west of these ridges the land is rolling to hilly. Farther west the topography becomes increasingly mountainous, especially in the four northwestern counties along the eastern fringe of the Cumberland Mountains.

*The Forest Area*

The Southeastern Section has a total land area of more than 3 million acres. Nearly three-fourths of this



land is forested.

About 2.2 million acres are commercial forest land. In addition there are 12,000 acres of forest land reserved from commercial timber cutting. Most of this reserved forest land is in State parks.

#### *Ownership*

About 91 percent of the commercial forest land is privately owned. Farmers own 23 percent and other private landholders own 68 percent. About half a dozen lumber and mining companies own more than 50,000 acres of forest land each.

The public owns the remaining 9 percent of the commercial forest land. Most of this is in the Monongahela National forest.

#### *The Forest Types*

The oak types occupy nearly half the commercial forest land. Red oak is the most extensive type in this group, followed by chestnut oak and white oak.

However, the most extensive single type is yellow-poplar. This type covers 28 percent of the commercial forest land. The sugar maple-beech-yellow birch type makes up 20 percent. Only 5 percent of the forest area is in softwood types.

#### *Condition Of The Forests*

More than 55 percent of the saw-timber volume is found on 16 percent of the forest land. This is the land that supports stands of more than 5,000 board feet per acre.

One-third of the saw-timber volume is found on 28 percent of the forest land--land that has stands of 1,500-5,000 board feet per acre. This leaves 56 percent of the commercial forest land bearing only 11 percent of the saw-timber volume.

#### *Timber Volume*

The Southeastern Section of West Virginia contains more than  $4\frac{1}{4}$  billion board feet of saw timber. Nearly one-fifth of this volume is red oak. Moreover, red oak and three other hardwoods (beech, sugar maple, and yellow birch) make up half the total saw-timber volume.

About 8 percent is in softwood species, chiefly hemlock and white pine. The rest is in a mixture of other hardwood species.

(Although all of the volume reported above meets the requirements for saw timber, some of it may not be operable from a strictly business viewpoint. Operability depends upon species, quality, volume per acre, accessibility, markets, and so on. These are the things that help determine whether one can cut timber and make money. However, it is not within the scope of this statistical report to distinguish between operable and inoperable timber stands. The purpose here is merely to report the total amount of timber that exists in this part of West Virginia. These statistics will be analyzed later in a comprehensive report for the entire State.)

The growing stock amounts to more than 1.4 billion cubic feet. About 55 percent of this volume is in saw-timber trees; the rest is in pole-timber trees.

The total cubic-foot volume is equivalent to nearly 18 million cords. Sixty-two percent of this volume is in trees of less than 15 inches' diameter.

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 1.--Land area and forest area, 1949

Class	Area	
	<u>Acres</u>	<u>Percent</u>
Forest land: <sup>1</sup>		
Commercial	2,201,800	73
Noncommercial <sup>2</sup>	12,300	(3/)
Total forest land	2,214,100	73
Nonforest land <sup>4</sup>	818,200	27
All land <sup>5</sup>	3,032,300	100

<sup>1</sup>See Appendix for definitions.

<sup>2</sup>Includes 7,100 acres in the Holly River State Park, 3,200 acres in Babcock State Park, and 1,200 acres in the Monongahela National Forest.

<sup>3</sup>Less than 0.5 percent.

<sup>4</sup>Includes about 13,000 acres of water in areas less than 40 acres.

<sup>5</sup>From Areas of the United States 1950, Bureau of the Census.



## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 2.--Land area and commercial forest area  
by county, 1949

County	Land	Commercial forest	
	<u>Acres</u>	<u>Acres</u>	<u>Percent</u>
Fayette	421,700	349,000	83
Greenbrier	656,600	465,600	71
Mercer	266,900	159,000	60
Monroe	302,700	152,900	51
Nicholas	415,400	328,500	79
Raleigh	386,600	285,200	74
Summers	229,800	154,200	67
Webster	352,600	307,400	87
Total	3,032,300	2,201,800	73

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 3.--Commercial forest area  
by ownership, 1949

Ownership	Area	
	<u>Acres</u>	<u>Percent</u>
Private:		
Farm forest land <sup>1</sup>	507,800	23
Other private	1,497,600	68
Total private	2,005,400	91
Public:		
National forest	181,100	9
Other federal <sup>2</sup>	7,500	(3/)
State <sup>4</sup>	5,400	(3/)
County	2,400	(3/)
Total public	196,400	9
All ownerships	2,201,800	100

<sup>1</sup>Census of Agriculture, 1950.<sup>2</sup>U. S. Army Engineers, Bluestone Reservoir.<sup>3</sup>Less than 0.5 percent.<sup>4</sup>Greenbrier State Forest.

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 4.--Commercial forest area  
by forest type, 1949

Forest type	Area	
	<u>Acres</u>	<u>Percent</u>
Red oak	599,900	27
Chestnut oak	258,100	12
White oak	161,600	7
Yellow-poplar	611,700	28
Sugar maple-beech-yellow birch	437,500	20
Other hardwood types	25,200	1
Hard pine types	63,100	3
Other softwood types	44,700	2
All types	2,201,800	100

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 5.--Commercial forest area by  
stand-size class, 1949

Stand-size class	Area	
	<u>Acres</u>	<u>Percent</u>
Saw-timber stands:		
More than 5,000 bd. ft. per acre	352,900	16
1,500-5,000 bd. ft. per acre	617,600	28
Pole-timber stands:		
More than 600 cu. ft. per acre	368,000	17
200-600 cu. ft. per acre	482,200	22
Other stands	381,100	17
All stands	2,201,800	100

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 6.--Net volume of live timber on commercial forest land by species, 1949

Species	Growing stock		Saw timber <sup>1</sup>
	<u>Thousand cu.ft.</u>	<u>Equivalent in cords<sup>2</sup></u>	<u>Thousand bd.ft.</u>
Red oak	241,100	3,013,800	809,400
Beech	127,600	1,595,000	479,200
Sugar maple	123,000	1,537,500	451,700
Yellow birch	96,300	1,203,800	404,100
Yellow-poplar	124,400	1,555,000	315,600
Chestnut oak	112,700	1,408,800	276,400
Hickory	91,000	1,137,500	228,100
Basswood	68,100	851,200	217,500
Red maple	75,100	938,800	189,500
White oak	80,700	1,008,800	185,700
Cucumbertree	30,500	381,200	98,400
Blackgum	25,700	321,200	92,000
Ash	20,800	260,000	57,200
Other hardwood	106,000	1,324,900	119,400
All hardwood	1,323,000	16,537,500	3,924,200
Hemlock	45,700	571,200	159,000
White pine	29,100	363,800	109,800
Hard pine	27,900	348,700	59,600
Other softwood	8,200	102,500	25,800
All softwood	110,900	1,386,200	354,200
All species <sup>3</sup>	1,433,900	17,923,700	4,278,400

<sup>1</sup>International  $\frac{1}{4}$ -inch log rule.<sup>2</sup>Rough standard cords. 1 cord = 80 cubic feet.<sup>3</sup>In addition there are 270 million cubic feet (net volume) in live cull trees.



## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 7.--Net volume of live timber on commercial forest land by diameter class, 1949

Diameter class <sup>1</sup> (inches at breast height)	Growing stock	Saw timber
	<u>Thousand cu.ft.</u>	<u>Thousand bd.ft.</u>
Hardwood:		
6	192,400	--
8	205,900	--
10	207,000	--
12	108,600	471,200
14	114,700	575,400
16	107,800	580,400
18	102,100	574,600
20	76,500	441,300
22	68,000	401,000
24	44,600	268,100
26	35,500	216,800
28	35,400	231,100
30 and larger	24,500	164,300
All hardwood	1,323,000	3,924,200
Softwood:		
6	14,300	--
8	22,000	--
10	9,800	38,900
12	11,900	54,000
14	8,900	40,400
16	8,700	41,200
18	12,600	59,100
20	4,300	21,700
22	8,100	41,800
24	1,500	8,200
26	7,000	39,700
28 and larger	1,800	9,200
All softwood	110,900	354,200
Softwood and hardwood	1,433,900	4,278,400

<sup>1</sup>The midpoint of each 2-inch diameter class is indicated.

## SOUTHEASTERN SECTION OF WEST VIRGINIA

Table 8.--Average net volume per acre of live timber  
on commercial forest land, by stand-size  
class, 1949

Stand-size class	Growing stock	Saw timber
	<u>Cubic feet</u>	<u>Board feet</u>
Saw-timber stands:		
More than 5,000 bd. ft. per acre	1,610	6,760
1,500-5,000 bd. ft. per acre	790	2,260
Pole-timber stands	400	480
Other stands	100	220
All stands <sup>1</sup>	650	1,940

<sup>1</sup>Hardwood constitutes 92 percent of the total board-foot volume, or 92 percent of the total cubic-foot volume.

## APPENDIX

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### DEFINITIONS OF TERMS

#### *Forest Area*

Forest land area.--Includes (a) lands that are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and which has not been developed for other use; and (c) afforested areas. (Forest tracts of less than 1 acre and isolated strips of timber less than 120 feet wide are excluded.)

Commercial forest land area.--Forest land that is (a) producing or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Noncommercial forest land area.--Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order, but that otherwise qualifies as commercial forest land, or (b) incapable of yielding usable wood products (usually saw timber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

#### *Forest Types*

Forest types are defined according to the species, or species group, that make up the major portion of the stand in terms of board feet in saw-timber stands or number of stems in other stands.

"Other hardwood types" include aspen-pin cherry, oak-white pine, and scrub oak. "Other softwoods" include white pine, spruce-hardwood, and hemlock.

#### *Stand-Size Classes*

Saw-timber stands.--Stands with saw-timber trees having a minimum net volume per acre of 1,500 board feet, International  $\frac{1}{4}$ -inch rule.

Pole-timber stands.--Stands failing to meet the saw-timber stand specification, but at least 10 percent stocked with pole-timber and larger trees (5.0 inches d.b.h. and



larger), and with at least half of the minimum stocking in pole-timber trees. (Pole-timber stands carry at least 200 cubic feet per acre.)

Other stands.--Forest stands that do not qualify as saw timber or pole timber; stands of seedlings and saplings; nonstocked areas.

### *Tree Classes*

Saw-timber trees.--Trees of commercial species that contain at least one merchantable sawlog as defined by regional practice and which are of the following minimum diameters at breast height (d.b.h.): Softwoods 9.0 inches and hardwoods 11.0 inches. (All butt sawlogs are considered merchantable. Where the butt is defective, upper sawlogs are considered merchantable if they account--in terms of aggregate volume--for 50 percent or more of the gross volume below the top of the uppermost sawlog. Softwood sawlogs are at least 6 inches in diameter, inside bark at small end; 8 to 16 feet in length; sound and straight enough to be manufactured into standard lumber. The smaller logs are generally free of surface defects other than small tight knots. Hardwood sawlogs are at least 8 inches in diameter inside bark at small end; 8 to 16 feet in length; suitable for sawing into standard lumber, construction timber, or ties.)

Pole-timber trees.--Trees 5.0 inches d.b.h. and larger of commercial species that do not meet the specifications for saw-timber trees but do meet regional specifications of species, soundness, and freedom from defect. (These are the trees that are straight and clear enough to make saw-timber trees eventually.)

Seedling and sapling trees.--Trees of commercial species less than 5.0 inches in diameter at breast height.

Cull trees.--Live trees of saw-timber or pole-timber size that are unmerchantable for sawlogs now or prospectively because of defect, rot, or species.

### *Timber Volume*

Growing stock.--Net volume, in cubic feet, of live saw-timber trees and live pole-timber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

(This volume is also given in rough, standard cords, bark included. Cord volume is derived from cubic-foot volume by applying a factor of 80 cubic feet per cord.)

Live saw-timber volume.--Net volume in board feet, International  $\frac{1}{4}$ -inch rule, of live saw-timber trees.

## FOREST SURVEY METHODS

These forest statistics for the Southeastern Section of West Virginia are based on information gathered from sample plots. These plots are distributed randomly over the entire area.

They were first located on aerial photographs. Trained photo interpreters then examined the photos and classified each forest plot according to stand size. Field crews inspected enough plots on the ground to attain a specified level of statistical accuracy. Species and volume data were collected on these ground plots.

The survey was designed for maximum accuracy in the estimate of total merchantable cubic volume.

## ACCURACY OF THE ESTIMATES

The estimates in this report may contain two kinds of error.

First, photo interpreters may make mistakes of judgment and fieldmen may make mistakes in measuring or recording. There is no practical way of finding out just how often such errors occur. But they are kept to a minimum by closely checking all phases of the work.

The second kind of error is associated with sampling procedures. The size of this error can be measured. In the Southeastern Section the chances are 2 to 1 that the error will not exceed 1.2 percent of the total forest area, 4.8 percent of the total board-foot volume, or 4.9 percent of the total cubic-foot volume.

In each of the tables, the total figures are more reliable than the subtotals. The subtotals are more reliable than any of the individual figures. Figures that are small in relation to totals are subject to larger sampling errors.



## SPECIES TALLIED

The various commercial tree species tallied in the Southeastern Section of West Virginia are listed below.<sup>1</sup> Approved common names are shown in parentheses if these differ from the brief name used in the tables.

*Hardwoods*

Red oak (Northern red oak)	- <u>Quercus borealis</u>
(Black oak)	- <u>Quercus velutina</u>
(Scarlet oak)	- <u>Quercus coccinea</u>
Beech (American beech)	- <u>Fagus grandifolia</u>
Sugar maple	- <u>Acer saccharophorum</u>
Yellow birch (Yellow birch)	- <u>Betula lutea</u>
(Sweet birch)	- <u>Betula lenta</u>
Yellow-poplar	- <u>Liriodendron tulipifera</u>
Chestnut oak	- <u>Quercus montana</u>
Hickory	- <u>Carya species</u>
Basswood (American basswood)	- <u>Tilia americana</u>
Red maple	- <u>Acer rubrum</u>
White oak	- <u>Quercus alba</u>
Cucumbertree	- <u>Magnolia acuminata</u>
Blackgum (Blackgum)	- <u>Nyssa sylvatica</u>
(Sweetgum)	- <u>Liquidambar styraciflua</u>
Ash	- <u>Fraxinus species</u>
Other hardwoods	
(Black cherry)	- <u>Prunus serotina</u>
(Yellow buckeye)	- <u>Aesculus octandra</u>
(Ohio buckeye)	- <u>Aesculus glabra</u>
(American elm)	- <u>Ulmus americana</u>
(Black walnut)	- <u>Juglans nigra</u>
(Butternut)	- <u>Juglans cinerea</u>
(Kentucky coffeetree)	- <u>Gymnocladus dioica</u>
(American sycamore)	- <u>Platanus occidentalis</u>
(Black locust)	- <u>Robinia pseudoacacia</u>

*Softwoods*

Hemlock (Eastern hemlock)	- <u>Tsuga canadensis</u>
White pine (Eastern white pine)	- <u>Pinus strobus</u>
Hard pine (Pitch pine)	- <u>Pinus rigida</u>
(Virginia pine)	- <u>Pinus virginiana</u>
Other softwoods	
(Table mountain pine)	- <u>Pinus pungens</u>
(Loblolly pine)	- <u>Pinus taeda</u>
(Red spruce)	- <u>Picea rubens</u>

<sup>1</sup> U.S. FOREST SERVICE. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. 325 PP. WASHINGTON. 1949.

